

From *S. discolor* Muhl. which *S. ancorifera* simulates, it is distinguished not only by the very long and characteristically recurved stigmas, but by the glandular tothing of its leaves and by the peculiar long pubescence of the midrib; the erect or merely divergent stigmas of *S. discolor* being only half as long as in *S. ancorifera* and the leaves never displaying the long pubescence on the midribs.

Whether *Salix ancorifera* is still growing at McIver's Cove is doubtful. When Waghorne was there in 1898, there were only a few settlers; now there is a considerable village and much of the better land in the region has been put under cultivation. In early July, 1929, Messrs. Long, Fogg and I went to McIver's Cove for fruiting material. The older inhabitants well remembered Waghorne and his visit there; but no one in the village had ever seen or heard of a *wild* willow. They had plenty of *S. viminalis* planted, but a search of several hours, in which we had the enthusiastic coöperation of the helpful population, indicated that the statement given us upon first landing, that no native willow now grows there, is apparently correct. This excessive localization of relic-endemic willows in Newfoundland is quite in keeping with the extreme localization there and in Gaspé of many other relic-endemics. Thus *Salix leirolepis* Fernald, "a very peculiar species" (Schneider, Bot. Gaz. lxxvii. 46), is known only from the type-collection from Table Mountain, Port au Port Bay; *S. chlorolepis* Fernald is known from only a single brook-valley on Mt. Albert in Gaspé; *S. amoena* Fernald, only from a single cove on Ha-Ha Bay, Straits of Belle Isle; *S. pedunculata* Fernald, from but two stations in northwestern Newfoundland; *S. obtusata* Fernald, a "remarkable species . . . of which much more copious material is needed to decide the question of its true relationship" (Schneider, Journ. Arn. Arb. i. 171), only from a single very limited stretch of river-gravel in Gaspé; *S. Wiegandii* (above described), only from the barrens near Old Port au Choix; and *S. latiuscula* Anderss., as yet not rediscovered and with the type-specimen lost, is apparently quite as rare. See p. 48.

(To be continued)

THE FLORA AROUND MISSISQUOI BAY, QUEBEC

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NUMEROUS contacts with the flora of western Vermont, especially with the limestone areas near Lake Champlain, led me to wonder what plants grew at the northern, Canadian end of the lake. I was

especially interested because of the very choice group of calciphile plants which I have found in Swanton, Vermont, growing above or on the red magnesian limestone which abounds there. I have, therefore, made four separate visits to Missisquoi Bay and the hamlet of Philipsburg, Quebec, and have listed about 280 species; not an exhaustive survey of the region, but perhaps sufficiently extensive to warrant a report at this time.

On the lake shore at Philipsburg is a good exposure of the great fault, geologically speaking, by which large masses of lower Cambrian limestone and marble were pushed over a much younger Ordovician deposit. This Ordovician shale on the lake shore splits easily into shingle, much of the rock being veined with calcite. Inland are great masses of the older rocks, and one of the largest marble quarries in the Dominion of Canada is located here.

All unshaded limestone areas, in settled country, and particularly around old quarries, have a large number of very vigorous weeds, which crowd out many if not all of the native plants. There are at least forty of these weeds in this locality. Those which show marked calciphile affinities include the following:

ALYSSUM ALYSSOIDES	CYNOGLOSSUM OFFICINALE
ARENARIA SERPYLLIFOLIA	ECHIUM VULGARE
ERYSIMUM CHEIRANTHOIDES	LAPPULA VIRGINIANA
MELILOTUS ALBA	LITHOSPERMUM OFFICINALE
VICIA CRACCA	NEPETA CATARIA
EUPHORBIA HELIOSCOPIA	

Of these, *Lappula virginiana* may be a native in this region. The rarest of the weeds noted is *Alyssum alyssoides*, which flourishes on the dry limestone. Blooming in May, its seeds are ripe in July. The plant is probably a winter annual. I have found this on the New York side of Lake Champlain, at Plattsburg, also in similar situations at Niagara Falls, Ontario. Once also, many years ago, I found it in sandy soil at Monument Beach, Bourne, Massachusetts.

In regard to *Cynoglossum officinale* it is interesting to note that Michaux, on his journey up the west side of Lake Champlain into Canada in 1792, found this plant already well established in the limestone country. The great abundance of *Nepeta Cataria* may be accounted for by the tradition that this herb was long ago introduced in the pastures as a source of nectar for bees.

At the west of International Highway No. 7, as you enter Canada, are flat ledges of limestone, some with light soil, others with

none. Occasional trees on this limestone are *Quercus macrocarpa*, *Juglans cinerea*, *Carya cordiformis* and *C. ovata*, *Ulmus fulva* and *U. americana*, and *Ostrya virginica*. In some places *Celastrus scandens* grows with *Rhus typhina*, forming thickets and fruiting heavily. The low form of *Rhus Toxicodendron* is frequent, and *Ribes Cynosbati* is occasional, but flourishes better in partial shade. The weed tree, *Crataegus punctata*, and numerous herbaceous weeds, also flourish here.

Beyond this dry strip with shallow sun-baked soil is a most wonderful glade-like woodland, which extends to the crest of the shore cliffs. In part of this the orchard-like forest is a solid formation of *Ostrya virginica*; in other places there are denser woods with sugar maples as well as hornbeams; on the lower levels toward the lake, especially on the shale, is a great abundance of *Thuja occidentalis*, without other trees. In the open woods under the hornbeam trees is a marvellous green carpet, in which the dominant species are *Cystopteris bulbifera* and *Mitella diphylla*.

In some such woodland not far away, "ad fines meridionales Canadae" by "Lac Champlain" Michaux found the unusual plant which he named *Mitella prostrata* (see Fernald, RHODORA viii, 90-92, 1906). Thinking it may have been here, one of my visits to this beautiful woodland was made on the King's Birthday, May 24, 1925. There were many thousand plants of *Mitella diphylla* in bloom, but after diligent search I was able to find no variations from the familiar type.

There are such charming spring and summer flowers in this region that I am tempted to comment on each species individually, but they are so numerous that a list must suffice.

ADIANTUM PEDATUM	TRILLIUM GRANDIFLORUM
ASPLENIUM PLATYNEURON	LAPORTEA CANADENSIS
CAMPTOSORUS RHIZOPHYLLUS	PARIETARIA PENNSYLVANICA
AGROSTIS PERENNANS	PILEA PUMILA
MELICA STRIATA	ASARUM CANADENSE
FESTUCA NUTANS	ACTAEA ALBA
ORYZOPSIS RACEMOSA	ACTAEA RUBRA
CAREX ALBICANS	HEPATICA ACUTILOBA
CAREX ALBURSINA	THALICTRUM DIOICUM
CAREX DEWEYANA	DICENTRA CUCULLARIA
CAREX EBURNEA	DICENTRA CANADENSIS
CAREX PEDUNCULATA	SANGUINARIA CANADENSIS
CAREX PLATYPHYLLA	DENTARIA DIPHYLLO
CAREX ROSEA	FRAGARIA VESCA var. AMERICANA
CAREX SPARGANIOIDES	RUBUS ODORATUS

RUBUS OCCIDENTALIS
 GERANIUM ROBERTIANUM
 VIOLA CANADENSIS
 VIOLA CONSPERSA
 VIOLA ERIOCARPA
 VIOLA ROSTRATA
 VIOLA SORORIA
 CIRCAEA ALPINA

CIRCAEA LATIFOLIA
 OSMORRHIZA CLAYTONI
 OSMORRHIZA LONGISTYLIS
 HYDROPHYLLUM VIRGINIANUM
 PHRYMA LEPTOSTACHYA
 GALIUM CIRCAEZANS
 SOLIDAGO CAESIA
 SOLIDAGO LATIFOLIA

Sanguinaria canadensis deserves mention, because here it grows on the limestone, the rhizomes following along crevices in the ledge where there is little food or moisture, until the plant becomes very stunted. In three stations in eastern Massachusetts, at Weymouth, Hingham and Cohasset, the plant also grows in this way on diabase ledges and among diabase boulders, rather consistently avoiding granite. This is an interesting habitat for a plant which habitually reaches its maximum development in the alluvium along our rivers.

The cliffs of Utica or Canajoharie shale reach the lake shore, but do not extend above the village of Philipsburg, where everything near the bay is nearly level. I have explored about half a mile along these cliffs. The shingle is so loose that there is little opportunity for vegetation to catch in. The cliffs are crowned with *Thuja* trees, with a few straggling shrubs of *Cornus circinata*. In some of the crevices are specimens of *Athyrium angustum* var. *laurentianum*. Two grasses are frequent on the headlands, *Trisetum spicatum* and *Sphenopholis pallens*. *Vitis vulpina* is frequent, and in some places gets a foothold in the shingle on the beach. *Potentilla Anserina* has succeeded in rooting in the scanty soil between the loose chips of shale, and sends out its strawberry-like runners in all directions. Another headland plant of special interest is *Thalictrum confine*, well known along the rocky shores of Lake Champlain in Vermont. There are some other shrubs and plants which grow in favored spots on the Vermont shore which I have not yet found on these headlands. Further search may reveal them.

Missisquoi Bay is sheltered by the Swanton peninsula, and gets no large waves from the open lake. There is not very much beach, therefore, but a sandy slope with even grade running down to the water, with some wetter sloughs back from the lake margin. It is like the shores of the St. Lawrence in many ways, with a broad band of vegetation, mostly herbaceous, backed up with a fringe of trees. There are five of these trees which are characteristic—*Populus deltoides*, *Salix nigra*, *Acer rubrum* and *A. saccharinum*, the latter the

more abundant of the two, and *Fraxinus pennsylvanica*, all of which are common along the lake in Vermont. Other willows which I have noted are the shrubs, *Salix cordata*, *S. discolor*, *S. lucida* and *S. rostrata*. *Cephalanthus occidentalis* is abundant, and there are many cornel bushes—*Cornus stolonifera*, *C. alternifolia* and *C. Amomum*. In the swamps near Clarenceville is abundance of *Spiraea alba* DuRoi (*S. salicifolia* of Gray's Manual, 7th ed.), and it is to be expected elsewhere along the bay, as it is abundant in Swanton and Alburg, Vermont.

Potentilla Anserina and *Gratiola aurea* are the two common beach plants, in great variety and profusion. The common grasses of the swales are *Spartina Michauxiana*, *Calamagrostis canadensis*, *Leersia oryzoides* and *L. virginica*. *Zizania aquatica*, var. *angustifolia* is frequent in pools, and in a ditch near Venice, at the head of the bay, I found in 1931 the broad-leaved typical *Z. aquatica* in considerable quantity. Common sedges are *Carex flava*, *C. granularis*, *C. hystericina*, *C. Tuckermanni*, *C. vesicaria* and *C. vulpinoidea*.

There were but two real surprises for me in this littoral belt, *Habenaria flava* and *Gerardia paupercula*. The *Habenaria* was not widely distributed, but grew in a large clump, with many specimens. The *Gerardia* grew in a sort of meadow, well back from the bay. It has several Vermont stations scattered along the northern end of Lake Champlain, as far north as Swanton.

Other species which are worth mentioning are:

EQUISETUM FLUVIATILE	RANUNCULUS REPTANS
ALISMA PLANTAGO-AQUATICA	PENTHORUM SEDOIDES
subsp. BREVIPES	POTENTILLA PALUSTRIS
ELYMUS VIRGINICUS	APIOS TUBEROSA
CYPERUS STRIGOSUS	HYPERICUM BOREALE
ELEOCHARIS PALUSTRIS var. MAJOR	HYPERICUM ELLIPTICUM
SCIRPUS AMERICANUS	HYPERICUM VIRGINICUM
SCIRPUS ATROVIRENS	EPILOBIUM GLANDULOSUM var.
SCIRPUS CYPERINUS var. PELIUS	ADENOCALON
SCIRPUS PEDICELLATUS	EPILOBIUM MOLLE
JUNCUS FILIFORMIS	CICUTA BULBIFERA
JUNCUS PELOCARPUS	CICUTA MACULATA
JUNCUS TENUIS	SIUM SUAVE
MYRICA GALE	STEIRONEMA CILIATUM
ALNUS INCANA	STEIRONEMA LANCEOLATUM
RUMEX PATIENTIA	MENYANTHES TRIFOLIATA
RUMEX VERTICILLATUS	APOCYNUM CANNABINUM
ANEMONE CANADENSIS	ASCLEPIAS INCARNATA
RANUNCULUS PENNSYLVANICUS	CUSCUTA GRONOVII

SCUTELLARIA EPILOBIIFOLIA
 SCUTELLARIA LATERIFLORA
 STACHYS ASPERA var. TENUIFOLIA
 GALIUM CLAYTONI

GALIUM PALUSTRE
 CAMPANULA ULIGINOSA
 LOBELIA CARDINALIS
 EUPATORIUM MACULATUM

My 1932 visit took me to a swamp near the marble mill, a swamp which had evidently received the fine-grained tailings from the marble. There were numerous species here which I did not find close to the lake. Here was a wonderful quantity of *Scirpus atrovirens*, specimens in all sizes, but even the most diminutive seemed true to type, and not likely to be confused with var. *georgianus*. Along with the willows common by the lake were *Salix nigra* var. *falcata* and *S. petiolaris*. *Typha angustifolia* and *T. latifolia* were abundant. There was much of *Agrostis stolonifera* var. *compacta*, the common species of the salt marshes. The rushes were *Juncus bufonius*, *J. Dudleyi*, *J. nodosus* and *J. balticus* var. *littoralis*. In the drier land there were many coarse weeds, among them *Solidago altissima* and a green-flowered *Asclepias syriaca*.

As a general conclusion I may state that the calciphile flora of the uplands around Philipsburg is practically the same as that of western Vermont. Further, the flora of the lake shore is rather closely related to that along the shores of the St. Lawrence between Montreal and Trois-Rivières, as at Lac St. Pierre.

About three miles east of Philipsburg, in St. Armand township, are wonderful big limestone cliffs and rich woods that may yield further discoveries of interest to the botanist.

HINGHAM, MASSACHUSETTS.

NOTES FROM SOUTHEASTERN WISCONSIN—II¹

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POLYSTICHUM ACROSTICHOIDES (Michx.) Schott. Apparently the only Wisconsin station of record is one north of Racine, Racine County (Wadmond, Trans. Wis. Acad., 16-2: 803, 1909), where a few individuals were taken on a rocky hillside. A single plant, only, was located in Richmond Township, Walworth County in the summer of 1931. It was taken in deep woodland, and quite likely a native station. This gives us but two stations in the State for the Christmas Fern!

ECHINOCHLOA WALTERI (Pursh) Nash. To the Wisconsin stations

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